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COMMERCIAL GROWING OF

HORSERADISH

Leaflet No. 547
U.S. DEPARTMENT OF AGRICULTURE

COMMERCIAL GROWING OF HORSERADISH

Crops Research Division, Agricultural Research Service

Where It Grows

Horseradish grows best in the north-temperate sections of the United States. It does not grow well in the South, except in the higher areas.

Horseradish will grow in almost any good soil, but does best on a deep, rich, moist loam that is well supplied with organic matter. It grows successfully on certain of the peat soils of the North. A shallow, poor soil with hard subsoil is not adapted for growing horseradish. This type of soil produces short, prongy roots. They have a higher percentage of waste and a lower market grade.

Commercial production centers in a few localities. The largest commercial production is found around East St. Louis, Ill., although considerable horseradish is grown in Wisconsin, New Jersey, California, and Pennsylvania. Near East St. Louis, horseradish is grown on both river-bottom and hill land; certain of the clay silts of this area are known for the quality and high pungency of horseradish they produce.

Varieties

Commercial growers and sellers generally divide horseradish varieties into two types, "common" and "Bohemian." The common type has broad, crinkled leaves

and produces roots of high quality. The Bohemian type has narrow, smooth leaves, is more resistant to some diseases, and is of lower quality. When you select a variety to grow, take care to get healthy stock of a strain that gives good results in your area.

Planting Stock

Horseradish is grown from root crowns and root cuttings (sets). It is not commercially propagated from seeds. Most of the commercial acreage is planted with root cuttings (fig. 1) rather than crowns.

Usually, planting sets are saved during the fall and winter while the crop is prepared for market. When you trim the roots, save all small or slender roots that are 8 to 14 inches long and are from the thickness of a lead pencil up to the thickness of a man's little finger. Cut these off, square at the top and sloping at the bottom. The sloped cut clearly indicates which is the lower end of the cutting. Then, tie sets in small bundles and store until spring. You can use either an outdoor pit or a barrel of slightly moistened sand in a cold cellar for storing.

Considerable difficulty often is experienced in keeping sets over winter. Take care to prevent their becoming heated or badly dried out; too much moisture, however, will cause sets to decay.

Fertilizers

Both stable manure and commercial fertilizers are used. Some growers plow under 12 to 20 tons of manure per acre in the fall. They plow the land deeply, even to the extent of bringing up some of the subsoil. Other growers apply manure with whatever crop was grown the preceding season. Do not apply manure in the spring of the year that you plant horseradish. This causes excessive

top growth and irregular branching roots. Horseradish roots tend to go deep; work manure and commercial fertilizer into the soil to a depth of 10 inches or more.

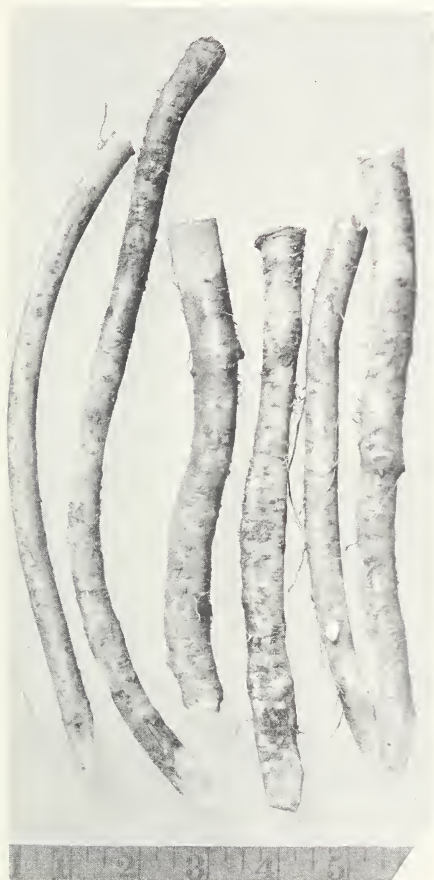
Commercial fertilizers recommended for horseradish, where manure has been used, should contain 50 pounds of nitrogen, 100 pounds of phosphoric acid, and 150 pounds of potash per acre. Where manure is not used, 100 pounds of nitrogen, 150 pounds of phosphoric acid, and 150 pounds of potash per acre are recommended. If the soil is low in available phosphoric acid and potash, then 200 pounds of each per acre are recommended. Best yields have been obtained where the fertilizer was applied broadcast and plowed under rather than on the surface after plowing.

If you have no manure, use soil-improvement crops in rotation with horseradish.

Preparing Soil and Planting

Plow soil as deeply as possible and as early in the spring as it is in condition to work. Harrow until it is in good working condition and then allow it to settle for several days before planting.

Mark the field into rows 30 inches apart; make the furrows 3 to 5 inches deep. Before planting, divide the field into sections with a paired number of rows in each section. Plant each of these sections with the tops of the cuttings pointing in the same direction. Later, during cultivation, run the cultivator in the same direction that the cuttings are planted. This



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FIGURE 1.—Horseradish sets, or root cuttings. Note the sloping cut at the lower end of each cutting.

reduces damage to the crowns when cultivating.

To plant, take an armful or a basketful of the sets, drop them 2 feet apart in the rows. Make sure the tops of the sets are all in one direction in this section. Then alternate the adjacent section of land by planting with the tops pointing in the opposite direction.

As each set is dropped, draw a little soil over the lower end of it with your foot and tamp it firmly. Use a cultivator to complete the covering of the sets and level the soil.

About 8,700 sets will plant an acre with this spacing—2 feet apart in rows 2½ feet apart.

Cultivating

Cultivate horseradish in the same way as other truck crops—with a weeder during the early stages of growth, and later with an ordinary one-row or two-row cultivator. Always cultivate in the direction in which the sets are planted.

Do not cultivate late in the season when tops grow so large as to practically close the spaces between the rows.

Lifting and Stripping

In order to grow higher market grades of horseradish for market, you must remove all top and side roots, leaving only those at the bottom of the set. Remove these roots twice during the season, first when the largest leaves are about 8 to 10 inches long, and again about 6 weeks later.

To remove roots from the sets,

first carefully remove the soil around the top end of the main root, leaving the roots at the lower end of the set undisturbed. Raise the crown end and remove all but the best sprout or crown of leaves. Rub off any small roots that have started from the top or sides of the set, leaving only those at the bottom. Return the set to its original position and replace the soil. This operation is called "lifting."

This method produces a comparatively smooth root free from side roots.

Diseases and Insects

Horseradish is attacked by a few pathogens and insects that can be serious where precautionary and control measures are not followed.

Rots are the most serious diseases affecting the crop; the causal agent of one form attacks the root from the inside, leaving only the outside walls, and another causes decay of the outer skin. Losses from disease occur mainly in storage pits, but may also occur in the field. The source of the disease is often traceable to storage pits where seed roots were kept.

Do not plant infected roots. Do not plant on land that has produced diseased crops. Plant horseradish on the same land no oftener than once in 3 or 4 years.

In the Northwest, sometimes horseradish is affected severely by curlytop, a virus disease spread by leafhoppers.

The most common insect enemy of the crop is the horseradish flea beetle. This insect often appears

just when the sprout is breaking through the ground, and it is extremely difficult to control. For information on controlling this and other insect pests of horseradish contact your county agricultural agent or your State agricultural experiment station.

Harvesting

Horseradish makes its greatest growth during late summer and early fall. For this reason, harvesting usually is delayed until October or early November. Where beets, carrots, and similar root crops are grown, they are generally harvested and stored before the horseradish crop.

Three or four days before harvesting horseradish roots, the tops should be removed as near to the ground as possible. For plowing out the roots, use a heavy plow that will turn a furrow about 15 inches wide. Plow a furrow alongside the first row to be harvested—in the opposite direction of cultivation. Then plow a second furrow, in the same direction, to turn out the roots. With 30-inch rows, each alternate furrow will turn out a row of roots.

Separate the roots from the soil and throw them in crates or wagons as each row is loosened.

Storing

Horseradish can be stored in a cool cellar, barn, outdoor pit, or cold storage.

To keep roots for summer marketing, put them immediately in cold storage or store them in a pit during the winter and then

put them in cold storage in the spring.

To store the roots in a trench or pit, select a well-drained site and plow out the soil 8 to 10 inches deep and not over 6 feet across. Line this trench with a layer of clean, dry straw. Pile the roots in the trench and cover with 6 inches of clean straw. As the



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FIGURE 2.—Horseradish root trimmed ready for the market. Note length of root as compared with 12-inch rule.

weather gets cold, throw about 6 inches of soil over the straw before the ground freezes. With colder weather, put on additional soil to protect the roots from freezing.

Protect roots that are stored in a barn by covering with straw or some other material. Those stored in a cellar, while not subject to freezing, must be kept well ventilated and as cool as possible.

Do not expose horseradish roots to the light. If you do, they will turn green.

Marketing

You can clean soil from the roots and pack them for market at any time during the winter when weather conditions permit.

Bring the roots into the packing shed, and trim off all lateral roots. Select and save any of the laterals that are reasonably straight, of sufficient size, and 8 to 14 inches long. Tie these in bundles and store for planting stock.

Trim the main roots (fig. 2) (the "sticks," as they are commonly called) around the crown and lower end, carefully removing all small rootlets or stubs.

Wash roots and pack them in barrels, each holding 100 pounds net weight. Both burlap-covered

and double-headed barrels are used for shipping the roots to the market.

Yields and Prices

Yields vary considerably, both with the season and with the locality. Yields range from less than 2,000 to more than 9,000 pounds of marketable roots to the acre. Prices also vary considerably from year to year.

Preparation for Use

Prepare horseradish commercially for table use by peeling or scraping the roots and removing all defects. Then, grate the root directly into white wine vinegar or distilled vinegar of 4½ to 5 percent strength. Do not use cider vinegar, as it causes the grated horseradish to turn dark within a comparatively short time. Bottle and tightly cap the horseradish as soon as possible after grating.

Refrigerate the prepared product at all times to keep it "hot." It will keep for a few weeks.

Horseradish also may be dried, ground to a powder, and put up in bottles in dry form. Prepared in this way, horseradish will keep much longer, but it does not make as fine a product as when grated fresh.

This leaflet supersedes Leaflet No. 129,
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